

# EUROPEAN PATENT OF CE

## Patent Abstracts of Japan

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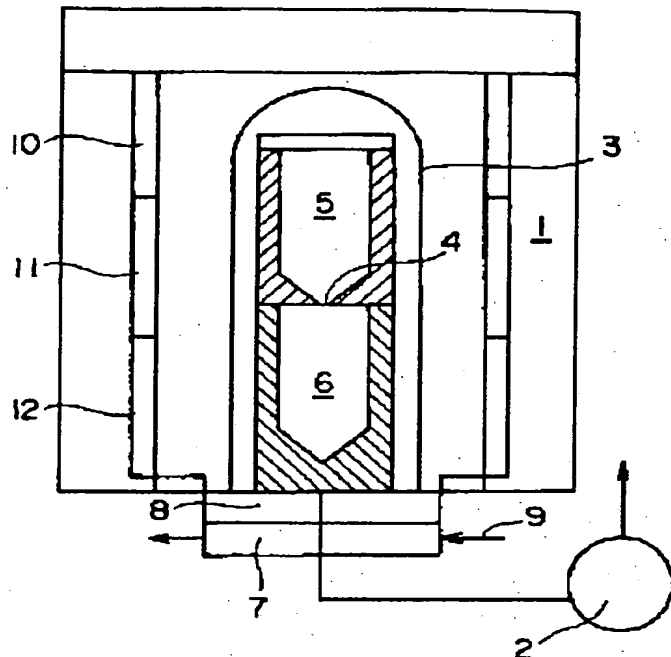
APPLICATION DATE : 21-06-96  
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INVENTOR : FUJIWARA SATOSHI;

INT.CL. : C23C 14/34 C22C 9/00 C30B 29/02

TITLE : SINGLE CRYSTAL COPPER TARGET  
AND ITS PRODUCTION AS WELL AS  
SEMICONDUCTOR INTERNAL WIRING  
FORMED BY USING THE SAME



**ABSTRACT :** **PROBLEM TO BE SOLVED:** To provide high-purity single crystal copper with which the production of a semiconductor element having highly corrosion resistant finer wirings is possible by sufficiently utilizing EM resistance and SM resistance which are the advantages of copper by forming film wirings on an Si substrate, thereby forming the semiconductor element, and a process for producing the same and further a sputtering target consisting of the resulted single crystal copper as well as the semiconductor element having the wirings formed by using this target.

**SOLUTION** High-purity copper having contg.  $\leq 0.1$  ppm silver and sulfur in total and having purity of  $\geq 99.9999$  wt.% is used as a starting raw material. This raw material is put into a raw material crucible 5 arranged in an electric furnace 1 and is melted. The molten copper is dropped to a lower single crystal casting mold 6 from the melt dropping hole 4 in the bottom of the crucible. During this time, the temp. is controlled by upper, middle and lower heaters 10, 11, 12 and the inside of a quartz outside cylinder 3 is evacuated by a vacuum discharge device 2. A heat insulating trap 8 exists in the bottom of the furnace and a water-cooled flange in which cooling water 9 flows is arranged on the outer side thereof. The high-purity single crystal copper adequate as the target material for forming the wirings of the semiconductor element is obtd. in the single crystal casting mold of this device.

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